



INTRODUCTION

Knowledge of the physical and hydrologic characteristics of geologic materials is useful in determining the availability of ground water for public and domestic supply and the suitability of areas for on-site septic systems. This report is a product of ongoing studies, performed in cooperation with the Municipality of Anchorage, that collect water-resources data to provide a better understanding of the area's hydrologic environment. The report shows the depth to bedrock (or thickness of unconsolidated sediments) in the Anchorage area. Most of the data used in this report are from well-driller logs for privately owned domestic wells.

GEOHYDROLOGY

Metamorphic bedrock is exposed at the surface in the mountains east and south of Anchorage. Beneath the low-lying areas of the Anchorage Bowl, older metamorphic bedrock is overlain by a thick wedge of younger sedimentary bedrock and a wedge of unconsolidated glacial and fluvial sediments. Both of these wedges thin toward the east and south. The metamorphic bedrock consists primarily of siltstone, graywacke, arkose, and conglomerate sandstone; and cherty gneiss associated with amphibolite. The sedimentary bedrock consists primarily of weakly consolidated clay, silt, and gravel, and thin coal beds. Almost all domestic wells completed in bedrock are located east and south of the metropolitan area and are near or on the mountain front; the bedrock penetrated in these areas is almost always metamorphic. Very few wells have penetrated the sedimentary bedrock that underlies the lowlands because an adequate thickness of water-yielding sediments can usually be found above the bedrock surface, generally at depths of less than 300 ft. East of Little Drive, wells commonly withdraw marginal supplies of water almost exclusively from bedrock at depths ranging from 50 to 400 ft below land surface. South of Rabbit Creek, most wells obtain water from bedrock or from unconsolidated sediments that are less than 100 ft thick.

CONVERSION TABLE

For the convenience of readers who may prefer to use metric (International System) units rather than the inch-pound units used in this report, values may be converted by using the following factors:

Multiply inch-pound unit	by	to obtain metric unit
Foot (ft)	0.3048	meter (m)
Gallon per minute (gal/min)	0.06308	liter per second (L/s)

61°05'

Wells completed in bedrock produce water from fractures or from zones in which the rock is deeply weathered. Domestic water-supply wells completed in bedrock commonly yield less than 5 gal/min, whereas domestic wells completed in unconsolidated sediments commonly yield 3 to 15 gal/min. If wells yield less than 3 gal/min, some means of storing water may be required to provide an adequate supply.

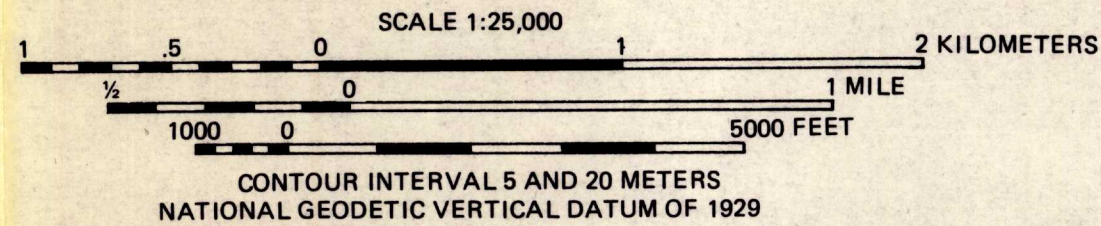
Where bedrock lies near the surface, the possibility may exist for effluent from septic systems to reach bedrock before being degraded to "safe" levels. Should this occur, the effluent could penetrate permeable fractures or weathered zones in the bedrock and travel quickly through them to contaminate wells or streams in the area. The likelihood of such contamination from septic systems depends on more than just depth to bedrock. Depth to the water table, distance to streams, permeability and sorptive capacity of the soils, slope of the land surface, and frozen ground or depth of seasonal frost are also significant factors.

DESCRIPTION OF THE MAP

This generalized map shows the approximate distance from land surface to the top of the bedrock surface. The depths shown were determined from lithologic data contained in driller logs that are on file at the U.S. Geological Survey's Water Resources Division office in Anchorage. Four depth zones are shown. The delineation of areas where bedrock occurs at the surface is based on geologic maps by Schmoll and Dobrovolsky (1972) and Schmoll and Emanuel (1981). The boundary between bedrock and unconsolidated sediments is commonly a broad transition area which is only approximated by the contact shown on the map.

REFERENCES CITED

- Emanuel, R.P., and Cowing, D.J., 1982, Hydrogeology for land-use planning—the Potter Creek area, Anchorage, Alaska: U.S. Geological Survey Water-Resources Investigations Open-File Report 82-86, 4 sheets.
- Schmoll, H.R., and Dobrovolsky, Ernest, 1972, Generalized geologic map of Anchorage and vicinity, Alaska: U.S. Geological Survey Miscellaneous Investigations Map 1787-A, 1 sheet.
- Schmoll, H.R., and Emanuel, R.P., 1981, Generalized geologic map and hydrologic properties of Potter Creek area, Municipality of Anchorage, Alaska: U.S. Geological Survey Open-File Report 81-1168, 1 sheet.



EXPLANATION

General depth to bedrock, in feet

- Bedrock at surface
- Less than 50
- 50 - 150
- Greater than 150

Boundary lines separating the depth zones approximate:

- Well-defined boundary
- Uncertain or gradational boundary
- 35 Water well - Number indicates depth to bedrock

MAP SHOWING DEPTH TO BEDROCK, ANCHORAGE, ALASKA

by
Roy L. Glass
1988